THE DETERMINANTS OF HEALTH CARE EXPENDITURE:
AN EMPIRICAL EVIDENCE FROM ASEAN COUNTRIES

By:

NOR FAIZAH BINTI AHMAD @ MOHAMMED RAZIKIN

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PERAKUAN KERJA KERTAS PENYELIDIKAN
(Certification of Research Paper)

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Nama Penyelia
(Name of Supervisor) : Dr. Sabri Nayan

Tandatangan
(Signature) :

Tanggal
(Date) : 15 Jun 2017

Dr. Sabri Nayan
Senior Lecturer
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ABSTRACT

The main motivation of this research project is to investigate the determinants of Health Care Expenditure (HCE), an empirical evidence from ASEAN countries. There are 200 total observations that involved annual data from 1995 to 2014 in Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Data collection for this study is based on secondary data that obtained from the Central of International Data, World Development Indicator (World Bank Database, 2016), World Health Organization (WHO, 2016), ASEAN Up Database and also from the central bank of each country. The data used in this study is to prove the significant relationship between dependent and independent variables for the four models. The first model, Panel A analyses the relationship between HCE with the Gross Domestic Product (GDP), Population, Life Insurance Coverage (LIC), Household Final Consumption Expenditure (HFCE) and Consumer Price Index (CPI).

For the second model, Panel B examines the significant influence of HCE, Population, LIC, HFCE, and CPI on the economic growth. Based on the variables of these both models, then Panel C and Panel D were generated by using natural logarithm (ln). Pooled Ordinary Least Square (POLS) of Regression Model revealed that Panel A found the GDP, Population, LIC and CPI are positively correlated to the HCE that have the statistical significant at 0.01 level. However, there is a negative relationship between HFCE and HCE at the statistical significant of 0.01 level. Next, Panel B indicated the HCE, LIC and HFCE have positive correlation with GDP at the statistical significant of 0.01 level except for LIC at 0.05 level. While, there is a negative relationship between Population and CPI with the GDP at statistical significant of 0.01 and 0.10 level respectively. Panel C represented the lnGDP, lnLIC, lnHFCE and lnCPI are positively correlated to the lnHCE that have the statistical significant at 0.01 level. However, there is a negative relationship between lnPop and lnHCE at the statistical significant of 0.01. Last but not least, Panel D showed the lnHCE, lnPop and lnLIC have positive correlation with lnGDP at the statistical significant of 0.01 level except for lnLIC that has no statistical influence. While, there is a negative relationship between lnHFCE and lnCPI with lnGDP at the statistical significant of 0.01 level. Regarding to these findings, this study was supported the previous
empirical works as well as presents the several policy implications and recommendations for research improvement in the future.

**Keywords.**

ASEAN Countries, Health Care Expenditure (HCE), Gross Domestic Product (GDP), Population, Life Insurance Coverage (LIC), Household Final Consumption Expenditure (HFCE), Consumer Price Index (CPI) and Regression Model of Pooled Ordinary Least Square (POLS).
ABSTRAK

Motivasi utama projek penyelidikan ini adalah untuk menyiasat pententu Perbelanjaan Penjagaan Kesihatan (HCE): bukti empirikal dari negara-negara ASEAN. Terdapat 200 jumlah pemerhatian yang melibatkan data tahunan dari 1995 sehingga 2014 di Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Pengumpulan data untuk kajian ini adalah berdasarkan data sekunder yang diperoleh daripada Central of International Data, World Development Indicator (World Bank Database, 2016), World Health Organization (WHO, 2016), ASEAN Up Database dan juga daripada bank pusat setiap negara. Data yang digunakan dalam kajian ini adalah untuk membuktikan hubungan yang signifikan antara pembolehubah bersandar dan pembolehubah bergerakbalas bagi keempat-empat model. Model pertama, Panel A menganalisis hubungan antara HCE dengan Keluaran Dalam Negara Kasar (GDP), Populasi, Perlindungan Insurans Hayat (LIC), Perbelanjaan Akhir Penggunaan Isi Rumah (HFCE) dan Indeks Harga Pengguna (CPI). Bagi model kedua, Panel B mengkaji pengaruh penting HCE, Populasi, LIC, HFCE dan CPI terhadap pertumbuhan ekonomi. Berdasarkan pembolehubah bagi kedua-dua model ini, maka Panel C dan Panel D dibentuk dengan menggunakan natural logarithm (ln). Model Regresi iaitu Pooled Ordinary Least Square (POLS) mendedahkan bahawa Panel A mendapati GDP, Populasi, LIC dan CPI berhubungan positif dengan HCE yang mempunyai signifikan statistik pada tahap 0.01. Manakala, terdapat hubungan negatif antara HFCE dan HCE pada tahap signifikan statistik 0.01. Seterusnya, Panel B menyatakan HCE, LIC dan HFCE mempunyai hubungan positif dengan GDP pada tahap signifikan statistik 0.01 kecuali bagi LIC pada tahap 0.05. Sementara itu, terdapat hubungan yang negatif antara Populasi dan CPI dengan GDP pada tahap signifikan statistik 0.01 dan 0.10 masing-masing. Panel C menunjukkan lnGDP, lnLIC, lnHFCE dan lnCPI berhubungan positif kepada lnHCE yang mempunyai signifikan statistik pada tahap 0.01. Manakala, terdapat hubungan negatif antara lnPop dan lnHCE pada tahap signifikan statistik 0.01. Akhir sekali, Panel D memperlihatkan lnHCE, lnPop dan lnLIC mempunyai hubungan positif dengan lnGDP pada tahap signifikan statistik 0.01 kecuali bagi lnLIC yang tidak mempunyai pengaruh statistic. Sementara itu, terdapat hubungan negative antara lnHFCE dan
lnCPI dengan lnGDP pada tahap signifikan statistic 0.01. Berhubung penemuan berkenaan, didapati kajian ini menyokong hasil empirical terdahulu di samping mengemukakan beberapa implikasi dasar beserta cadangan bagi penambahbaikan penyelidikan pada masa hadapan.

Kata kunci.

Negara-negara ASEAN, Perbelanjaan Penjagaan Kesihatan (HCE), Keluaran Dalam Negara Kasar (GDP), Populasi, Perlindungan Insurans Hayat (LIC), Perbelanjaan Akhir Penggunaan Isi Rumah (HFCE), Indeks Harga Pengguna (CPI) dan Model Regrasi iaitu Pooled Ordinary Least Square (POLS).
ACKNOWLEDGEMENT

Alhamdulillah, I would like to offer thanks a lot to Allah s.w.t for His gift. Without Him, I would not be implemented this academic dissertation successfully. The process writing of this research project was very helpful and taught me to gain more knowledge and experience that will be useful in the future. An outstanding cooperation of dedicated professional to Graduate School of Business, Othman Yeop Abdullah (OYA) that made the creation of the thesis as a pleasure. Thank very much to my supervisor of BDMZ69912 Dissertation, Dr. Sabri bin Nayan, who plays the main role to help me in completing this thesis by giving the invaluable guidance, comments and suggestions. I will forever be grateful for all your kind words of encouragement.

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(NOR FAIZAH BINTI AHMAD @ MOHAMMED RAZIKIN)
# TABLE OF CONTENTS

## DESCRIPTION

THE DETERMINANTS OF HEALTH CARE EXPENDITURE: AN EMPIRICAL EVIDENCE FROM ASEAN COUNTRIES

## CERTIFICATION

PERMISSION TO USE

## ABSTRACT

ABSTRAK

## ACKNOWLEDGEMENT

TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF ABBREVIATIONS

## CHAPTER ONE

INTRODUCTION

1.0 Introduction

1.1 Overview of Health Care Expenditure (HCE) from Global Perspective

1.1.1 The United States is the Highest Spender on Health Care

1.1.2 The United States has Poor Population Health

1.2 Overview of Health Care Expenditure in ASEAN Countries

1.3 Problem Statements

1.4 Research Questions

1.5 Objectives of the Study

1.6 Significance of the Study

1.7 Scope of the Study

1.8 Organization of the Study

1.9 Conclusion
CHAPTER TWO

LITERATURE REVIEWS

2.0 Introduction

2.1 A Brief Review of the Literature: The Determinants of Health Care Expenditure (HCE)

2.2 Modelling Techniques of the Health Care Expenditure (HCE)

2.3 Key Finding from the Previous Studies

2.3.1 Gross Domestic Product (GDP)

2.3.2 Population

2.3.3 Life Insurance Coverage (LIC)

2.3.4 Household Final Consumption Expenditure (HFCE)

2.3.5 Health and Economic Growth

2.4 Conclusion

CHAPTER THREE

DATA AND RESEARCH METHODS

3.0 Introduction

3.1 Theoretical Basis

3.2 Data Collection and Description of Panel Data

3.3 Variable Specifications

3.3.1 Dependent Variables

3.3.1.1 Health Care Expenditure (HCE)

3.3.1.2 Gross Domestic Product (GDP)

3.3.2 Independent Variables

3.3.2.1 Population

3.3.2.2 Life Insurance Coverage (LIC)
3.3.2.3 Household Final Consumption Expenditure (HFCE)

3.3.2.4 Consumer Price Index (CPI)

3.4 Theoretical Framework

3.5 Hypothesis Development

3.6 Econometric Model

3.7 Statistical Testing Model

3.7.1 T-static Test

3.7.1.1 The Comparison of t-static and t-table

3.7.1.2 The Probability

3.7.2 f-static Test

3.7.2.1 The Comparison of f-static and f-table

3.7.2.2 The Probability

3.7.3 Coefficient Determination

3.8 Empirical Method

3.8.1 Descriptive Statistics

3.8.2 Pearson Correlation

3.8.3 Multiple Regression Model

3.8.3.1 Analysis of Variance (ANOVA)

3.8.3.2 Pooled Ordinary Least Square (POLS)

3.8.4 Panel Data Analysis

3.8.4.1 Common Effects (CE)

3.8.4.2 Fixed Effects (FE)

3.8.4.3 Random Effects (RE)

3.8.5 Specification Test of the Panel Data Analysis

3.8.5.1 Likelihood Ratio

3.8.5.2 Hausman Test
CHAPTER FOUR

RESULTS AND FINDINGS

4.0 Introduction

4.1 Descriptive Statistics

4.2 Pearson Correlation

4.3 Analysis of Static Model. Multiple Regressions
   4.3.1 Analysis of Variance (ANOVA)
   4.3.2 Pooled Ordinary Least Square (POLS)
   4.3.3 Panel Data Analysis
      4.3.3.1 Common Effects (CE)
      4.3.3.2 Fixed Effects (FE)
      4.3.3.3 Random Effects (RE)
   4.3.4 Specification Tests of the Panel Data Analysis
      4.3.4.1 Likelihood Ratio
      4.3.4.2 Hausman Test
      4.3.4.3 Lagrange Multiplier (LM) Test
   4.3.5 Diagnostic Test
      4.3.5.1 Multicollinearity Test
      4.3.5.2 Heteroskedasticity Test
4.3.6 Granger Causality Test

4.4 Discussion of the Findings

4.5 Conclusion

CHAPTER FIVE
CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

5.2 Objective Summary of the Study

5.3 Summary of the Previous Empirical Works

5.4 Summary of the Hypothesis Testing and Findings

5.5 Policy Implications

5.6 Limitations of the Current Study

5.7 Recommendations for the Future Research

5.8 Conclusion
LIST OF TABLES

Table 1.1 : Population Health Outcomes and Risk Factors at 2014
Table 1.2 : Comparative Profile for ASEAN
Table 1.3 : ASEAN Health Care Financing Schemes
Table 2.1 : Techniques by Previous Empirical Works
Table 3.1 : Data Descriptions
Table 3.2 : Sampling of the Countries
Table 3.3 : Scale Indices of Pearson Correlation
Table 4.1 : Descriptive Statistics
Table 4.2 : Correlation Matrix
Table 4.3 : Model Summary
Table 4.4 : ANOVA
Table 4.5 : Regression Model: Pooled Ordinary Least Square (POLS)
Table 4.6 : Panel Data Analysis
Table 4.7 : Specification Test of Panel A and Panel B
Table 4.8 : Variance Inflation Factor (VIF)
Table 4.9 : Modified Wald Test of Panel A and Panel B
Table 4.10 : Pairwise Granger Causality Tests
Table 5.1 : Summary of the Previous Empirical Works
LIST OF FIGURES

Figure 1.1 : Health Care Expenditures as a Percentage of GDP (1995–2014)
Figure 1.2 : Health Care Expenditure per Capita (HCEpC) in ASEAN
Figure 1.3 : Public or Private Share of Health Care Funding in ASEAN
Figure 3.1 : Theoretical Framework of the First Model (Panel A)
Figure 3.2 : Theoretical Framework of the Second Model (Panel B)
Figure 3.3 : Theoretical Framework of the Third Model (Panel C)
Figure 3.4 : Theoretical Framework of the Fourth Model (Panel D)
LIST OF ABBREVIATIONS

ADF : Augmented Dickey–Fuller;
ANOVA : Analysis of Variance;
ASEAN : Association of Southeast Asian Nations;
BNM : Bank Negara Malaysia;
CE : Common Effects;
CPI : Consumer Price Index;
FE : Fixed Effects;
GDP : Gross Domestic Product;
GMM : Generalized Method of Moments;
HCE : Health Care Expenditure;
HFCE : Household Final Consumption Expenditure;
LIC : Life Insurance Coverage;
MAS : Monetary Authority of Singapore;
OECD : Organisation for Economic Co-operation and Development;
POLS : Pooled Ordinary Least Square;
Pop : Population;
PP : Phillips–Peron;
RE : Random Effects;
UK : United Kingdom;
U.S. : United States;
WHO : World Health Organization;
\( \beta_0 \): An Intercept;
\( \beta_0 + v_i \): Constant of Each Section;
\( \beta_{0i} \): Heterogeneity or Unobserved Effect;
\( \beta_1, \beta_2, \beta_3, \beta_4, \beta_5 \): Coefficient of the Parameters;
\( H_1 \): Null Hypothesis;
\( H_2 \): Alternate Hypothesis;
\( i \): Cross-sectional Unit;
\( \ln \): Natural Logarithm;
\( \text{Sig.} \): Significance;
\( t \): Time Period;
\( \text{vif} \): Variance Inflation Factor;
\( v_i \): Zero Mean Standard Random Variable;
\( \mu_{it} \): Error Term (Disturbance Term);
\( \bar{x} \): Mean of Sample;
\( \sigma \): Standard Deviation.
CHAPTER ONE

INTRODUCTION

1.0 Introduction

According to Medical Dictionary, health care could be illustrated as the maintaining and restoration of health by the treatment and prevention of disease especially by trained and licensed professionals such as in medicine, dentistry, clinical psychology and public health (Thomas Fishbein, 2008). The World Health Organization explained health as the perfect conditions either in mental, physical and well-being as well as not merely to infirmity or the absence of disease (Porta, 2014). Last but not least, health care is the prevention or treatment of illness by doctors, dentists or psychologists. In addition, it also can be defined as an effort in order to maintain or restore the physical health by the treatment of professional and licensed bodies (Merriam Webster, 2015).

The main motivation of this research project is to investigate the determinants of Health Care Expenditures (HCE): an empirical evidence from ASEAN countries. There are twenty years of annual data from 1995 to 2014 that involved ten countries such as Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. By reviewing an existing literature, this study attempts to provide evidence about the main indicators that influenced the expenditures on the health care. Most of the existing literatures have focused on the relationship between health care and economic growth. Therefore, this study contributes to the literature by broadening the body of research on this scarcely investigated area.
The contents of the thesis is for internal user only
REFERENCES


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Perspective.


Affairs, 31(1), 208–219.


Orszag, P. R., & Ellis, P. (2007). The Challenge of Rising Health Care Costs – A View


### APPENDIX 1. RESIDUAL NORMALITY TEST [MODEL 1 @ PANEL A]

<table>
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<td>Jarque-Bera</td>
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APPENDIX 1. RESIDUAL NORMALITY TEST [MODEL 2 @ PANEL B]

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<td>Sample</td>
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</tr>
<tr>
<td>Observations</td>
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<td></td>
<td></td>
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<td></td>
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<td>Mean</td>
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<td>3.75E+10</td>
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<td>Maximum</td>
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<tr>
<td>Kurtosis</td>
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APPENDIX 1. RESIDUAL NORMALITY TEST [MODEL 3 @ PANEL C]

Series: Standardized Residuals
Sample: 1995 2014
Observations: 200

Mean: 3.23E-15
Median: 0.024800
Maximum: 0.540833
Minimum: -0.940066
Std. Dev.: 0.281133
Skewness: -0.708266
Kurtosis: 3.577994
Jarque-Bera: 19.50534
Probability: 0.000058
APPENDIX 1. RESIDUAL NORMALITY TEST [MODEL 4 @ PANEL D]

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<td>Minimum</td>
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APPENDIX 2. GENERALIZED METHOD OF MOMENTS [MODEL 1 @ PANEL A]

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<th>Variable</th>
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<th>Two Step</th>
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<td></td>
<td>GMM Difference</td>
<td>GMM System</td>
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<tr>
<td><strong>Panel A</strong></td>
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<td></td>
</tr>
<tr>
<td>HCE L1.</td>
<td>1.093651 (0.000)**</td>
<td>1.096353 (0.000)**</td>
</tr>
<tr>
<td>GDP</td>
<td>1.87E-10 (0.111)</td>
<td>2.21E-10 (0.037)**</td>
</tr>
<tr>
<td>Pop</td>
<td>7.95E-07 (0.647)</td>
<td>1.34E-06 (0.000)**</td>
</tr>
<tr>
<td>LIC</td>
<td>3.191196 (0.521)</td>
<td>0.0021082 (0.908)</td>
</tr>
<tr>
<td>HFCE</td>
<td>-2.19E-10 (0.151)</td>
<td>-2.53E-10 (0.019)**</td>
</tr>
<tr>
<td>CPI</td>
<td>0.1398696 (0.544)</td>
<td>0.0681994 (0.746)</td>
</tr>
<tr>
<td>_cons</td>
<td>-50.75865 (0.521)**</td>
<td>-80.50212 (0.001)**</td>
</tr>
</tbody>
</table>

### APPENDIX 2. GENERALIZED METHOD OF MOMENTS [MODEL 2 @ PANEL B]

<table>
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<td>GMM System</td>
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<td>GDP L1.</td>
<td>0.5708762 (0.000)***</td>
<td>-1.77E-09 (0.008)***</td>
</tr>
<tr>
<td>HCE</td>
<td>3.80E+07 (0.000)***</td>
<td>5.644644 (0.000)***</td>
</tr>
<tr>
<td>Pop</td>
<td>-1003.485 (0.217)</td>
<td>2.31E-06 (0.000)***</td>
</tr>
<tr>
<td>LIC</td>
<td>-1.17EE+08 (0.965)</td>
<td>-863.9484 (0.000)***</td>
</tr>
<tr>
<td>HFCE</td>
<td>6.64E-09 (0.000)***</td>
<td>2.18E-09 (0.000)***</td>
</tr>
<tr>
<td>CPI</td>
<td>2.236087 (0.107)</td>
<td>-12.8861 (0.000)***</td>
</tr>
<tr>
<td>_cons</td>
<td>0 (omitted)</td>
<td>1814.072 (0.000)***</td>
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</tbody>
</table>

Note: The *, ** and *** are 10%, 5% and 1% level of significant.
### APPENDIX 2. GENERALIZED METHOD OF MOMENTS [MODEL 3 @ PANEL C]

<table>
<thead>
<tr>
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<td>0.6059715</td>
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<td>lnHCE</td>
<td>0.0316289</td>
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<td>L1.</td>
<td></td>
<td></td>
<td>L1.</td>
<td>(0.907)</td>
<td>(0.887)</td>
</tr>
<tr>
<td>lnGDP</td>
<td>3307888</td>
<td>(0.000)**</td>
<td>lnGDP</td>
<td>0.456355</td>
<td>(0.012)</td>
</tr>
<tr>
<td></td>
<td>0.2998472</td>
<td>(0.000)**</td>
<td></td>
<td>(0.112)</td>
<td>(0.166)</td>
</tr>
<tr>
<td>lnPop</td>
<td>0.0595437</td>
<td>(0.772)</td>
<td>lnPop</td>
<td>-4.193433</td>
<td>(0.322)</td>
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<tr>
<td></td>
<td>-0.365987</td>
<td>(0.000)**</td>
<td></td>
<td>(0.294)</td>
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</tr>
<tr>
<td>lnLIC</td>
<td>0.0021082</td>
<td>(0.908)</td>
<td>lnLIC</td>
<td>-0.0596058</td>
<td>(0.279)</td>
</tr>
<tr>
<td></td>
<td>0.023485</td>
<td>(0.111)</td>
<td></td>
<td>(0.400)**</td>
<td></td>
</tr>
<tr>
<td>lnHFCE</td>
<td>0.0197291</td>
<td>(0.768)</td>
<td>lnHFCE</td>
<td>1.882122</td>
<td>(0.021)</td>
</tr>
<tr>
<td></td>
<td>0.0929847</td>
<td>(0.001)**</td>
<td></td>
<td>(0.018)**</td>
<td></td>
</tr>
<tr>
<td>lnCPI</td>
<td>0.0590095</td>
<td>(0.157)</td>
<td>lnCPI</td>
<td>-0.3200125</td>
<td>(0.645)</td>
</tr>
<tr>
<td></td>
<td>0.0554389</td>
<td>(0.090)*</td>
<td></td>
<td>(0.765)</td>
<td></td>
</tr>
<tr>
<td>_cons</td>
<td>-8.116945</td>
<td>(0.006)**</td>
<td>cons</td>
<td>18.5917</td>
<td>(0.740)</td>
</tr>
<tr>
<td></td>
<td>-2.214283</td>
<td>(0.000)**</td>
<td></td>
<td>(0.682)**</td>
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</tr>
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</table>

Panel C

# APPENDIX 2. GENERALIZED METHOD OF MOMENTS [MODEL 4 @ PANEL D]

<table>
<thead>
<tr>
<th>Variable</th>
<th>One Step</th>
<th>Two Step</th>
<th>Variable</th>
<th>Two Step</th>
</tr>
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<td></td>
<td>GMM Difference</td>
<td>GMM System</td>
<td></td>
<td>GMM Difference</td>
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<tr>
<td>lnGDP L1.</td>
<td>0.5043596</td>
<td>(0.000)***</td>
<td>lnGDP L1.</td>
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<td>lnHCE</td>
<td>0.2565488</td>
<td>(0.000)***</td>
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<td>0.4050988</td>
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<tr>
<td>lnPop</td>
<td>0.4649498</td>
<td>(0.006)**</td>
<td>lnPop</td>
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<tr>
<td>lnLIC</td>
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<td>(0.359)</td>
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<td>0.069847</td>
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<tr>
<td>lnHFCE</td>
<td>0.2848588</td>
<td>(0.000)***</td>
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<td>lnCPI</td>
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<tr>
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<td>-3.735359</td>
<td>(0.140)</td>
<td>cons</td>
<td>44.52119</td>
</tr>
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</table>

Note: The *, ** and *** are 10%, 5% and 1% level of significant.